## MECHANICAL SYMBOLS CONDENSATE RETURN PIPING FLANGE OR FLANGED PIPING CONNECTION ------ CR ------WALL TRANSFER DUCT ABOVE CEILING FLEXIBLE PIPE CONNECTION W/ FIRE DAMPER \_\_\_\_\_ CD \_\_\_\_\_ CONDENSATE DRAIN PUMPED CONDENSATE PIPING DUCT OR EQUIPMENT PRESSURE GAGE CONNECTION THERMOMETER CHILLED WATER RETURN PIPING ----- CHWR -----SIDEWALL DIFFUSER THERMOMETER WELL ------ HWR ------ HOT WATER RETURN PIPING CEILING SUPPLY AIR SEPARATOR DIFFUSER (4-WAY — LPS — LOW PRESSURE STEAM PIPING THROW) RECTANGULAR DUCT & SIZE CEILING SUPPLY LOW PRESSURE CONDENSATE DIFFUSER WITH DIRECTIONAL AIR FLOW 1-WAY, 2-WAY, OR ----- MU ----- MAKEUP WATER 10"ø ROUND DUCT AND SIZE 3-WAY THROWS ARROWS INDICATE \_\_\_\_\_ D \_\_\_\_ DIRECTION OF FLOW) CEILING RETURN 20x10 <del>←</del> OVAL DUCT AND SIZE EXHAUST GRILLE ----- CS ----- CONDENSER WATER SUPPLY LINEAR SLOT DIFFUSER INTERNALLY LINED 10x12 ------ CR ------- CONDENSER WATER RETURN RECTANGULAR DUCT (SIZE INDICATED IS INSIDE TRANSFER GRILLE DIMENSION) PIPE TURNING DOWN DOUBLE WALL INSULATED ROUND OR OVAL (SIZE DIFFUSER / REGISTER MARK PIPE TURNING UP 10"ø OR 10x12 <del>↔</del> INDICATED IS INSIDE SEE SCHEDULE DIMENSION) DIRECTION OF AIR FLOW SUPPLY DUCT TURNING UP **→** OR **→** PIPING BRANCH TAKE-OFF FROM AIR FLOW MONITOR TOP OF MAIN PIPING SUPPLY DUCT TURNING DOWN SMOKE DETECTOR DIRECTION OF FLOW MOTORIZED DAMPER RETURN OR EXHAUST DUCT CONCENTRIC REDUCER THERMOSTAT (MOUNTED AT "ANSI- 300" CODE CMPR ECCENTRIC REDUCER MTG HEIGHT (4'-0" A.F.F. TO OPERATING POINT COEF RETURN OR EXHAUST DUCT ON T'STAT) HUMIDISTAT (MOUNT CON TURNING DOWN GATE VALVE NEXT TO T'STAT) FLEXIBLE DUCTWORK $\longrightarrow$ GLOBE VALVE HORIZONTAL UNIT HEATER ANGLED GATE VALVE VARIABLE AIR VOLUME BOX 90° ELBOW W/TURNING VANES ANGLED GLOBE VALVE VARIABLE AIR VOLUME BOX WITH COIL BALL VALVE FIN TUBE RADIATION --BUTTERFLY VALVE SPLITTER DAMPER UNITS DASHES INDICATE FINNED LENGTH BUTTERFLY VALVE ROOF VENTILATOR, TWO-WAY CONTROL VALVE $\longrightarrow$ (MAY BE OF 2-POS OR MODULATING) MOTOR OPERATED OPPOSED BLADE VOLUME DAMPER ROOF VENTILATOR, EXHAUST THREE-WAY CONTROL VALVE **─**₩ (MAY BE OF 2-POS OR MODULATING) MOTORIZED MODULATING MANUAL OPPOSED ROOF VENTILATOR, LOUVERED TYPE BUTTERFLY CONTROL BLADE VOLUME VALVE OF ELECT. OR DAMPER PNEUMATIC OPERATOR (MAY BE OF 2-WAY OR BRANCH DUCT FROM 3-WAY DESIGN) TRUNK DUCT USING 45° ANGLE, HIGH MOTORIZED TYPE GATE OR FIRE DAMPER - $\forall$ EFFICIENCY FITTING GLOBE CONTROL VALVE OF AND DAMPER ELECT. OR PNEUMATIC OPERATOR DESIGN ROUND BRANCH $\longrightarrow$ SOLENOID VALVE (ELECTRIC) DUCT FROM (2-POS.) RECTANGULAR TRUNK SMOKE DAMPER DUCT USING CHECK VALVE CONICAL SPIN-IN W/ DAMPER -MULTI-PURPOSE OR TRIPLE-DUTY VALVE FLOWMETER MPV OR TDV FIRE/SMOKE DAMPER "B&G" (OR EQUAL) TRIPLE DUTY OR MULTI-PURPOSE P&T TAP VALVE (MANUAL OPERATED DESIGN) (MAY BE STRAIGHT TDV OR MPV IN-LINE PATTERN OR ANGLE AIR VENT (MANUAL) PUMP SUCTION DIFFUSER CIRCUIT-SETTER TYPE MANUAL $\dashv \Diamond \vdash$ UNION PIPE CONNECTION WATER BALANCE VALVE w/WTR. FLOW SWITCH TEST TAP CONNECTIONS OS&Y VALVE PRESSURE SWITCH IN-LINE TYPE PUMP EXTER - $\top$ -CONDENSATE TRAP VERTICAL TYPE CLOSE-COUPLED IN-LINE PIPE MTD. ELECTRIC DRIVEN CENTRIFUGAL PUMP (FLANGED F TO F CONN'S.) PREMIUM EFF. MOTOR (w/FACTORY AIR PRESSURE REDUCING VALVE FA FACE AREA VENT TAP CONN'S & DRAIN PLUGS & INTEGRAL SEALED CAPTIVE—AIR TANK ("CATK") FD FIRE DAMPER, FLOOR DRAIN FACTORY FOOT MTG SUPPORT (FOR HYDRONIC (w/FACTORY INTERNAL SEALED WATER PIPING SYSTEM PUMP SERVICE) SINGLE AIR PRESSURED BLADDER RELIEF VALVE, SAFETY VALVE (PRESSURE TYPE) FOR HYDRONIC WATER PIPING SYSTEM AIR-CONTROL CONNECT SYMBOL FOR NEW SYSTEMS OF PIPE OR DUCTS, ETC. TO EXISTING SYSTEMS P&T VALVE FLANGED (OR SCREWED) TYPE VORTEX TYPE HYDRONIĆ FLOW CONTROL VALVE COMDO AIR-DIRT SEPARTOR 0 INDOOR TYPE CEILING MTD. HTG (BALANCING VALVE) UNIT (w/INTERNAL AIR-DIRT & CLG. CASSETTE UNIT (VRV SEP/SCREEN & AUTO-OPER SYSTEMS) W/ INTEGRAL DRAIN (FOR HYDRONIC WATER GAS PRESSURE REGULATOR PIPING SYSTEM AIR-CONTROL CONDENSATE PUMP (RATED FOR 33" HG. PUMP DISCHARGE HEAD) & DIRT SEPARTION) (AIR-DIRT SEPARTOR) "IDU-X" INDOOR DUCTLESS SPLIT SYS UNIT PETCOCK INDOOR UNIT - WALL MTD. HTG & CLG. UNIT (DUCTLESS SPLIT STRAINER "IDU-X" INDOOR SYSTEMS AIR CONDITIONER) W/ DUCTLESS SPLIT INTEGRAL CONDENSATE PUMP SYS UNIT (RATED FOR 33" HG. PUMP STRAINER W/BLOWOFF DISCHARGE HEAD) "MSID-1": MINI-SPLIT INDOOR WALL MTD. OR ABOVE CEILING MTD. DATA ROOM INDOOR UNIT ENVIRONMENTAL HTG & COOLING UNIT W/ INTEGRAL CONDENSATE PUMP (RATED FOR 33" HG. CONDENSATE PUMP DISCHARGE HEAD);

/	ABOVE	FLEX	FLEXIBLE	PRI	PRIMARY
CUM	ACCUMULATE	FT	FOOT, FEET	PRV	PRESSURE REDUCING VALVE
J	AIR CONDITIONING UNIT	FT LB	FOOT-POUND	PSF	POUNDS PER SQUARE FOOT
J -	ADJUSTABLE	FOB	FLAT ON BOTTOM	PSFA	POUNDS PER SQUARE FOOT ABSOLUTE
J	ABOVE FINISHED FLOOR AIR HANDLING UNIT	FOT FP	FLAT ON TOP FREEZING POINT	PSFG	POUNDS PER SQUARE FOOT
,	ANALOG INPUT	FPM	FEET PER MINUTE	PSI	POUNDS PER SQUARE INCH
В	AMBIENT	FPS	FEET PER SECOND	PSIA	POUNDS PER SQUARE INCH
SI	AMERICAN NATIONAL STANDARDS INSTITUTE	F & T	FLOAT & THERMOSTATIC	PSIG	ABSOLUTE POUNDS PER SQUARE INCH
	ANALOG OUTPUT	FR FS	FROM FIRE/SMOKE DAMPER, FREEZE STAT	F 310	GAGE
PROX	APPROXIMATE	FVEL	FACE VELOCITY	PT	PRESSURE TRANSDUCER, PRESSURE TRANSMITTER
<b>.</b> _	AIR SEPARATOR	G	GRAVITATIONAL CONSTANT	R/A	RETURN AIR
ΜE	AMERICAN SOCIETY MECHANICAL ENGINEERS	GA	GAGE OR GAUGE	RAD	RADIAT(-E, -OR)
1	ATMOSPHERE	GAL	GALLONS	RAG RAO	RETURN AIR GRILLE RETURN AIR OPENING
}	AVERAGE	GC	GENERAL CONTRACTOR	RCVR	RECEIVER
P	BRAKE HORSEPOWER	GPD GPH	GALLONS PER DAY GALLONS PER HOUR	REC	RECOVERY
٧	BELOW	GPM	GALLONS PER MINUTE	RECIRC	RECIRCULATE
	BLOW-OFF	GRV	GRAVITY ROOF VENT	REFRIG	REFRIGERANT
D C	BOTTOM OF DUCT	GTD	GREATEST TEMPERATURE DIFFERENCE	REG REQ'D	REGISTER REQUIRED
S	BOITOM OF STEEL BOILING POINT	HD	HEAD	RES	RESIST(-ANCE, -IVITY, -OR)
	BLOW THRU	HF	HEPA FILTER	REV	REVOLUTIONS
J	BRITISH THERMAL UNIT	HG	HEAT GAIN	RH	RELATIVE HUMIDITY
V	BACK WATER VALVE	HGT HHW	HEIGHT HEATING HOT WATER	RHC RM	REHEAT COIL ROOM
	CELSIUS	НОА	HAND-OFF-AUTOMATIC	RPM	REVOLUTIONS PER MINUTE
го с	CENTER TO CENTER	HP	HORSE POWER	RPS	REVOLUTIONS PER SECOND
,	COEFFICIENT, VALVE FLOW		TIMHIGH PRESSURE STEAM	S/A	SUPPLY AIR
3.	CABINET		CHIGH PRESSURE STEAM CONDENSATE	SAG	SUPPLY AIR GRILLE
/	CONSTANT AIR VOLOME	HR HTR	HOUR HEATER	SAT	SATURATION SMOKE DAMPER
WR	CHEMICAL FELD	H & V	HEATING AND VENTILATING UNIT	SD	SMOKE DAMPER, SMOKE DETECTOR
ws		HW	HEATING HOT WATER	SENS	SENSIBLE
1	CUBIC FEET PER HOUR	HWP	HOT WATER PUMP	SF	SUPPLY FAN, SAFETY FACTOR
Ŋ	CUBIC FEET PER MINUTE	HWR HWS	HEATING HOT WATER RETURN HEATING HOT WATER SUPPLY	SG	SPECIFIC GRAVITY
WP	CHILLED WATER PUMP	HX	HEAT EXCHANGER	SH	SENSIBLE HEAT
PR		HXP	HEAT EXCHANGER PACKAGE	SHG SP	SENSIBLE HEAT GAIN STATIC PRESSURE
EF	COEFFICIENT	IAQ	INDOOR AIR QUALITY	SP HT	SPECIFIC HEAT
NC	CONCRETE	IB I/O	INVERTED BUCKET INPUT/OUTPUT	SP VOL	SPECIFIC VOLUME
ND RL	CONDENS(-ER, -ATE, -ING, -ATION) CONTROL	IRH	INFRARED HEATER	SPEC	SPECIFICATION
\L	CONDENSER UNIT	IZW	IZII OWATT	SPLY SQ	SUPPLY SQUARE
FT	CUBIC FEET	KW KWH	KILOWATT KILOWATT HOUR	S/S	STAINLESS STEEL
IN	CUBIC INCH			STD	STANDARD
	CHECK VALVE	LAT LB/HR	LEAVING AIR TEMPERATURE POUNDS PER HOUR	STM S/COND	STEAM CONDENSATE
P	COLD WATER CONDENSER WATER PUMP	LBS	POUNDS PER HOUR	SUCT	SUCTION
-	DECIBEL, DRY BULB	LG	LENGTH	TA	TRANSFER AIR
Т	DRY BULB TEMPERATURE	LH	LATENT HEAT	TD	TEMPERATURE DIFFERENCE,
G	DEGREE	LIQ	LIQUID	TEMP	THERMODYNAMIC TRAP TEMPERATURE
NS	DENOTIT	LPS LVG	LOW PRESSURE STEAM LEAVING	TG	TRANSFER GRILLE
	DOOR GRILLE DIGITAL INPUT	LWT	LEAVING WATER TEMPERATURE	THERM	THERMOMETER
	DIAMETER			TK TOD	THICK, THICKNESS TOP OF DUCT
F	DIFFUSER	MAX	MAXIMUM	TOS	TOP OF STEEL
PR	DAMPER	MBD	MANUAL OPPOSED BLADE BALANCING DAMPER	TRANS	TRANSFER
	DOWN	MBH	1000 BTU PER HOUR	TS	TEMPERATURE SENSOR
	DIGITAL OUTPUT DEPTH, DEEP, DIFFERENTIAL PRESSURE	MC	MECHANICAL CONTRACTOR  MOTORIZED DAMPER	T'STAT	THERMOSTAT
Т	DEW POINT TEMPERATURE	MECH	MECHANICAL MECHANICAL	TYP	TYPICAL
AC	DUCTLESS SPLIT AIR CONDITIONER	MFG	MANUFACTURER	UC UF	UNIT CONDITIONER UNDER FLOOR
/G	DRAW THRU DRAWING	MIN	MINIMUM	UH	UNIT HEATER
2	DIRECT EXPANSION	MPS MTD	MEDIUM PRESSURE STEAM MOUNTED	UNO	UNLESS NOTED OTHERWISE
	EACH	N/A	NOT APPLICABLE	URF	UNDER RAISED FLOOR
Γ	ENTERING AIR TEMPERATURE	NC	NOISE CRITERIA	V VAC	VALVE, VOLT VACUUM
С	ECCENTRIC	N.C.	NORMALLY CLOSED		VAPOR PROOF
R	EQUIVALENT DIRECT RADIATION  EXHAUST FAN	ND NEF	NECK DIAMETER NEW EXHAUST FAN	VAR	VARIABLE
Α	EXHAUST AIR	NEMA	NATIONAL ELECTRICAL	VAV	VARIABLE AIR VOLUME
<del>.</del>	EFFICIENCY	NIC	MANUFACTURER'S ASSOCIATION NOT IN CONTRACT	VD VEL	VOLUME DAMPER VELOCITY
	EXHAUST GRILLE	NK	NECK	VEL	VENTILATION
EC .	ELEVATION ELECTRICAL	NO.	NUMBER	VERT	VERTICAL
Γ	ENTERING	N.O. NTS	NORMALLY OPEN NOT TO SCALE	VF	VENTILATION FAN
)	EXTERNAL STATIC PRESSURE	0/A	OUTSIDE AIR	VFD	VARIABLE FREQUENCY DRIVE
· D	EXPANSION TANK	OAI	OUTSIDE AIR INTAKE	VISC VOL	VISCOSITY VOLUME
NP Τ	EVAPORAT(-E, -ING, -ED, -OR) ENTERING WATER TEMPERATURE	OBD	OPPOSED BLADE DAMPER	W	WATT
' <del> </del>	EXHAUST	OC	ON CENTER	WB	WET BULB
ST	EXISTING	OR OV	OVERRIDE OUTLET VELOCITY	WBT	WET BULB TEMPERATURE
<b>)</b>	EXPANSION	OV OZ	OUNCE	WG WH	WATER GAGE WATER HEATER
ר ר	EXTERNAL	P&T	PRESSURE AND TEMPERATURE	W⊓ W/	WITH
ΓER	EXTERIOR	PC	PUMPED CONDENSATE	WMS	WIRE MESH SCREEN
	DEGREES FAHRENHEIT	PD PDU	PRESSURE DROP POOL DEHUMIDIFICATION UNIT	WP	WEATHER PROOF
-	40. 1.40		. SOL DELIGINIDII IOMITON UNII	18/ 1	WEIGHT
ГО F	FACE TO FACE FACE AREA	PH	PHASE	WT YD	YARD

GENERAL NOTES - FOR THE HVAC UPGRADE PROJECT WORK: (ALSO SEE MECHANICAL PLAN NOTES & SPECS.)

MECHANICAL BIDDING CONTRACTOR PRE-QUALIFICATIONS REQUIRED: THE MECHANICAL HVAC CONRACTOR SHALL BE A PRE-QUALIFIED CURRENT N.C. REGISTERED AND LICENSED MECHANICAL CONTRACTOR FOR THIS PROJECT UPGRADE WORK. THE MECHANICAL CONTRACTOR SHALL ALSO BE A PRE-QUALIFIED "DAIKIN" FACTORY TRAINED INSTALLER OF VRV SYSTEMS AS CERTIFIED BY "DAIKIN". hE/SHE SHALL POSSESS CREDENTIALS TO A "DAIKIN" CERTIFIED REGISTERED INSTALLER OF THE SPECIFIED NEW "VRV" RFRIGERANT SPLIT-DX HEAT-RECOVERY TYPE SYSTEMS, AND SHALL PROVIDE TO THE ENGINEER AND THE OWNER THE WRITTEN PROOF OF HIS/HERS "DAIKIN" TESTED AND TRAINED "DAIKIN" INSTALLATION SCHOOL AND TRAINING DOCUMENTATION WITH THE CURRENT AND VALID CERTIFICATES WHICH SHALL BE DATED AS AND WITHIN THE PAST CURRENT (1) YEAR PERIOD OF THE TIME OF HIS/HER BIDDING THIS UPGRADE PROJECT. AS A "DAIKIN" TRAINED INSTALLER, HE/SHE SHALL SUBMIT A WRITTEN LIST OF HIS PAST PROJECT INSTALLATION EXPERIENCE AND HAVE PROOF OF A MINIMUM OF THE PAST 7-YEARS OF HIS PAST MECHANICAL SELF-PERFORMED "VRV" INSTALLATIONS AND EXPERIENCE IN THAT OF THE INSTALLATION OF "DAIKIN" "VRV" (3-PIPE) HEAT RECOVERY TYPE VRV INSTALLATIONS WHICH INCLUDE THAT OF SINGLE MECHANICAL PROJECTS THAT HAVE HAD MULTIPLE VRV SYSTEMS OF EQUAL SIZED "VRV" SYSTEMS TO THAT OF THIS HVAC UPGRADE SYSTEMS PROJECT. IF THE CONTRACTOR CANNOT PROVIDE THE ABOVE, HE/SHE CANNOT BE ALLOWED TO BID AND BE AWARDED THE CONTRACT FOR THIS PROJECT HVAC UPGRADE.

- 1. ALL NEW REFRIGERANT PIPING SHALL BE OF SIZES SHOWN AND SHALL BE "ASTM-B88" TYPE "K" OR "L" COPPER PIPING UNLESS NOTED OTHERWISE; ALL INTERIOR ABOVEGROUND REFRIGERANT & HVAC CONDENSATE DRAIN WATER PIPING & ABOVEGROUND EXTERIOR REFRIGERANT & DRAIN WATER PIPING SHALL BE INSULATED W/CLOSED-CELL 3 THICK ELASTOMERIC INSULATION IAW "PITTSBURG-CORNING" - "ARMAFLEX"; ALL EXTERIOR INSULATED PIPING SHALL BE FINISHED WRAPPED & COVERED WITH AN EXTERIOR PVC (WHITE) PRE-MOULDED SELF-LOCKING JACKETING COVERS FOR STRAIGHT PIPE RUNS AND ALL FITTINGS
- 2. ALL NEW EXPOSED EXTERIOR ABOVEGROUND INSULATED PIPING SHALL BE INSTALLED w/PROTECTIVE PVC JACKETING (0.016" THICK) OVER FINISHED INSULATION MATERIAL: ALL INTERIOR ABOVEGROUND CONCEALED & EXPOSED INSULATED PIPING WHICH IS PROTECTED FROM EXTERIOR WEATHER DOES NOT REQUIRE PROTECTIVE PVC JACKETING
- IF PROJECT DRAWINGS SHOW NEW WORK TO INCLUDE NEW PIPE AND DUCTWORK SYSTEMS AND ACCESSORIES FOR THE PROJECT, AS MAY BE NOTED AND APPLICABLE TO THE WORK, THE MAXIMUM LENGTH OF FLEXIBLE DUCT RUN-OUTS TO TERMINALS & DIFFUSERS SHALL NOT EXCEED 8'-0". ALL FLEXIBLE DUCT CONNECTIONS TO LOW PRESS. DUCT OR DOWNSTREAM OF TERMINAL UNIT, (SUCH AS TRUNK & BRANCH DUCT TAKE-OFFS, ETC.) SHALL BE ACCOMPLISHED BY INSTALLING CONICAL SPIN-IN FITTINGS WITH VOLUME DAMPER AND MANUAL LOCKING QUADRANT. SECURE FLEXIBLE DUCT TO FITTING WITH WORM GEAR OPERATED, STAINLESS STEEL BAND CLAMP.
- 4. THE CONTRACTOR SHALL COORDINATE MECHANICAL WORK WITH THAT OF THE OTHER TRADES AND OWNERS EXISTING BLDG. CONSTRUCTION AND OTHER NEW WORK BEING PERFORMED WHILE THIS PROJECT IS BEING CONSTRUCTED; COORD. ALL WORK PRIOR TO THE INSTALLATION OF ANY MECHANICAL EQUIPMENT, DUCTWORK OR PIPING. CONFIRM ALL NEW REPLACED FINISHED CEILING HEIGHTS BEFORE FABRACATION & INSTALLATION OF NEW DUCTWORK OR EQUIPMENT OR INSTALL OF NEW REPLACED CEILINGS. NOTE THAT NEW INDOOR HVAC UNITS LOCATED ABOVE CEILINGS & LOCATED IN ABV. CEILING AREAS SHALL BE PLACED WITHIN THE EXISTING APPROX. 24"HG. CLEAR SPACE ABOVE CEILINGS AT SHOWN LOCATIONS. (SEE & REQUEST FROM OWNER THE OWNER'S EXIST. AVAILABLE EXIST. ORIGINAL MECH & ELECT. DWGS. OF THE BLDG & ALSO OTHER PAST UPDATED PAST PROJECT DWGS. AVAILABLE FROM OWNER IN ELECTRONIC PDF FILES. THESE REFERENCED PDF DWGS ARE NOT INCORPORATED INTO THE PROJECT DWGS SET. (THESE CAN BE MADE AVAILABLE TO THE SUCCESSFUL CONTRACTOR)
- 5. ALL WORK SHALL CONFORM TO APPLICABLE LOCAL & N.C. STATE CODES. EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS & IAW CODES REQMTS. INCLUDING ACCESS CLEARANCES & MAINTAINANCE ACCESSES. ALL INDOOR VRV HVAC UNITS SHALL HAVE INTEGRAL CONDENSATE PUMPS SUPPLIED WITH THE UNITS. FOR ANY TOTALLY CONCEALED FAN & COIL COOLING UNIT OF DUCTED OR NON-DUCTED TYPE UNITS LOCATED ABOVE & WITHIN THE NEW CEILINGS THESE UNITS SHALL BE PROVIDED WITH EMERGENCY DRAIN PANS EQUIPPED w/CODE REQ'D FLOAT SWITCHES FOR INDOOR UNIT SHUTDOWNS. PROVIDE CODE SMOKE DETECTORS FOR ALL UNITS FOR AUTO-SHUTDOWN OF FANS IAW CODE REMTS ..
- 6. REFER TO ALL MECHANICAL & ELECTRICAL PLANS & SPECIFICATIONS FOR THE WORK TO BE DONE UNDER THIS PROJECT. DO NOT SCALE THE DRAWINGS. REFER TO THESE PROJECT DWGS. AND ANY REFERENCED OWNERS DWG'S. FOR ADDITIONAL EXISTING BUILDING CONDITIONS.
- 7. THE MECH, CONTRACTOR SHALL COORDINATE THE INSTALLATION OF EQUIPMENT MTD. AND/OR DUCT MTD. DEVICES IN THE PROJECT WORK: TO INSTALL ELEC. SUPPLIED AND WIRED SMOKE DETECTORS IN THE SUPPLY & RETURN AIR SYSTEMS IN NEW AIR HANDLING UNITS, AS MAY BE APPLICABLE. SMOKE DETECTORS FURNISHED UNDER DIV.16 ELECT. SHALL BE U.L. LISTED FOR DUCT/SURFACE INSTALLATION. DIV.16 PROVIDED SMOKE DETECTORS SHALL BE COMPATIBLE WITH UNITS & VOLTAGES REQMTS. OF HVAC UNITS SYSTEMS. COORDINATE WITH DIV.16 ELECTRICAL CONTRACTOR WIRING BY DIV.16 ELEC. CONTRACTOR.
- 8. THE DIV15M CONTRACTOR SHALL PROVIDE AND INSTALL ALL HIS OWN DESIGNATED & FURNISHED EQUIPMENT (INCLUDING ALL DESIGNATED NEW VRV HVAC EQUIPMENT, HANGARS, SUPPORT STANDS, ETC. AND ACCESSORIES). ALL NEW INTERIOR & EXTERIOR HVAC PIPING & ANY OTHER SPECIFIED MECH. CONTRACTOR FURNISHED EQUIPMENT, TO BE INSTALLED BY MECH. CONTRACTOR SHALL BE COORDINATED WITH ALL TRADES PRIOR TO INSTALLATION. ALL HVAC EQUIPMENT SHALL BE SUPPORTED & RESTRAINED PER CODES & ALL NEW EQUIPMENT. SUPPORTS SHALL MEET "IBC" SEISMIC & CATEGORY REQUIREMENTS AS MAY BE REQ'D. OF THE LOCAL & STATE BUILDING CODE. ANY SUPPORTS FOR SEISMIC RESTRAINTS SHALL BE INSTALLED PER THE ANSI "SEISMIC RESTRAINT MANUAL GUIDELINES FOR MECHANICAL SYSTEMS" SECOND EDITION FEBRUARY 1998, AND LATEST "ADDENDUM NO.".
- ANY & ALL WALLS AND ROOF PIPING AND EQUIPMENT OPENINGS SHALL BE PROVIDED W/SHEETMETAL PIPING WALL SLEEVES FULLY CAULKED COMPLETE WITH WATER-TIGHT CAULKING MATERIAL PER THE SPECS. AND FOR ROOF OPENINGS, A MIN. 16" HG. INSULATED ROOF CURBS, AND AS MAY BE APPLICABLE TO THE WORK, SHALL BE INSTALLED TO PROVIDE MAX. SPACE FOR MAINTEN. & SERVICE CLEARANCES OF EQUIP.
- 10. U.N.O. ANY DISTURBED NEW PIPING & DUCTS SHALL BE PROPERLY CONNECTED & INSULATED AS APPLICABLE; (FOR ANY <u>INTERIOR</u> SUPPLY DUCT & RETURN DUCT IN CONCEALED OR UN-CONDITIONED SPACES) USE "OCF" FOIL-FACED 2"THK."ASJ' WRAP INSULATION. INTERIOR EXPOSED & CONCEALED DUCTS SHALL ALL BE SINGLE WALL SPIRAL ROUND OR OR RECTANGULAR DUCTS (PER SMACNA STDS.) & EXTERIORLY INSULATED WITH 2" THICK EXTER. DUCT-WRAP INSULATION. EXPOSED OR CONCEALED EXHAUST DUCT SHALL BE SINGLE WALL SPIRAL, ROUND OR RECTANGULAR DUCTS AND SHALL NOT REQUIRE INSULATION. ALL EXTERIOR DUCTWORK & FITTINGS SHALL BE INSULATED W/MIN. OF  $1-\frac{1}{2}$ " TK. CLOSED CELL FLEXIBLE UNI—CELLULAR SHEET INSULATION (IAW MFGR. REQUIRMENTS) AND FINISHED W/ (0.016" TK.) ALUMINUM JACKETING OVER ALL DUCTWORK.

11. WHERE PROJECT DRAWINGS SHOW NEW WORK TO INCLUDE NEW ROOFTOP UNITS, AHU'S, ETC. AND NEW DUCTWORK WITH THESE SYSTEMS, THE SYSTEMS AND ACCESSORIES FOR THESE UNITS SHALL INCLUDE ALL NEW INTERIOR ALL METAL & FLEX. DUCTS. ALL FLEXIBLE DUCT SHALL BE INSULATED TYPE, SOUND ATTENUATING, LOW VELOCITY TYPE AND SHALL COMPLY WITH NFPA 90A AND 90B. FLEXIBLE DUCT SHALL BE U.L. LISTED, CLASS 2 INSULATED TYPE, RATED FOR A MINIMUM OF 4-6" NEGATIVE OR POSITIVE PRESSURE. DUCT SHALL BE FACTORY FORMED, COMPOSED OF SPIRAL WOUND, CORROSION RESISTANT WIRE BONDED TO AN INNER FABRIC LINER COVERED WITH 1-1/2" THICK INSULATION (UNLESS OTHERWISE NOTED) WITH VAPOR BARRIER.

- 12. PROJECT DRAWINGS SHOW NEW WORK TO INCLUDE NEW DUCTWORK SYSTEMS AND ACCESSORIES FOR THE PROJECT, AS MAY BE APPLICABLE TO THE WORK, DUCTWORK AS SHOWN ON THE DRAWINGS IS STRICTLY DIAGRAMMATIC. DIV.15M MECH. CONTRACTOR SHALL FIELD VERIFY ALL EXITING FRAMING AND BLDG STEEL LOCATIONS & SUPPORTS LOCATIONS AND COORDINATE THESE FOR ANY INTERFERENCES TO THAT OF NEW UNITS ABOVE CEILINGS, ALL NEW PIPING & NEW DUCT AS APPLICABLE AND/OR COORDINATE ALL NEW DUCT LOCATIONS WITH THE BUILDING STRUCTURE & THAT OF ALL NEW WORK; DO NOT LOCATE DUCTS WHICH MAY INTERFERE W/OTHER TRADES WORK AND MAINTENANCE OR ACCESSIBLITY. CONTACT ENGINEER AND OWNER BEFORE INSTALLING ANY TIGHT OR PROBLEM AREAS OF ANY NEW SYSTEMS AND NEW UNIT LOCATIONS.
- 13. PROJECT DRAWINGS SHOW NEW ALL NEW ROOF MTD. UNITS AND NEW REFRIFERENT PIPING AND NEW ROOFTOP HVAC UNITS & ASSOCIATED DUCTWORK SYSTEMS AND ACCESSORIES FOR THESE LOCATIONS/PROJECT, AS APPLICABLE TO THE WORK. ALL NEW METAL DUCT SHALL BE CONSTRUCTED OF ALL ALUMINUM OR GALVANIZED STEEL SHEETS, UNLESS NOTED OTHERWISE, & DUCTS SHALL BE INSTALLED IN ACCORDANCE WITH LATEST UPDATES OF THE 2007 "SMACNA" GUIDE, FOR GAGES AND STANDARDS. ALL NEW DUCT JOINTS SHALL BE"TDC" TYPE OR OTHER MECHANICALLY FASTENED/BOLTED & GASKETED JOINTS & CONN'S. ALL DUCT CHANGES WHICH MAY BE REQUIRED SHALL MEET THE REQUIRED ENGINEER'S PRIOR APPROVAL BEFORE CHANGES OR FABRICATIONS OCCUR FOR THESE INSTALLATIONS. ALL JOINTS SHALL REQUIRE GASKETED "TDC" CONN'S. AND ALL JOINTS SHALL BE DUCT-SEALED WITH DUCT SEALANT PER ENGINEER'S APPROVAL/SPECS. AND MADE AIRTIGHT PRIOR TO INSTALL OF ALL NEW DUCT INSIULATION. NO SQUARE CORNER DUCTWORK ELBOWS SHALL BE ALLOWED TO BE INSTALLED ANYWHERE ON THE PROJECT UNLESS NOTED OR OTHERWISE SHOWN. ALL TURNS/BENDS & ELBOW FITTINGS ON ALL DUCTS SHALL BE MADE W/CURVED RADIUS ELBOWS OR CURVED HEELS/THROATS ONLY & ALL BENDS SHALL NOT HAVE ANY TURNING VANES. PROVIDE BALANCE DAMPERS IN ALL BRANCH TAKE—OFFS OF SUPPLY AND RETURN DUCTS AND IN ALL TERMINAL DUCTS RUN—OUTS FOR ALL SYSTEMS. ALL ROUND & RECTANGULAR DUCTS DAMPERS SHALL BE MULTIPLE OPPOSED-BLADE DAMPERS AND SHALL BE OF THE QUADRANT LOCKING TYPE & SHALL BE MADE OF ALL ALUMINUM OR ALUMIZED STEEL.
- 14. DIV15M MECH. CONTRACTOR SHALL FURNISH TO THE OWNER & ENGINEER UPON COMPLETION OF PROJECT, A BOUND SET OF TEST & BALANCE REPORTS OPERATING AND MAINTENANCE INSTRUCTIONS FOR ALL NEW VRV SYSTEMS AND ALL OTHER SPECIFIED NEW SYSTEMS AND EQUIPMENT & DUCTWORK SYSTEMS. CONTRACTOR SHALL PROVIDE FOR THE WORK AN SIGNED AFFIDAVIT SIGNED BY THE DIV. 15 MECH. CONTRACTOR, CONTROLS CONTRACTOR, & TEST/BALANCE CONTRACTOR THAT THE BUILDING HAS BEEN ADJUSTED & SET/LEFT IN A POSITIVE - PRESSURE CONDITION OF (A MINIMUM OF 0.03" W.G.) POSITIVE AIR PRESSURE.
- 15. AS MAY BE APPLICABLE TO THE NEW EQUIPMENT & WORK, PROVIDE NEW REPLACEMENT AIR FILTERS ON ALL NEW MECH. AHU'S, FANS & OTHER NEW EQUIPMENT SUPPLIED UNDER DIV15M PRIOR TO OWNER'S OPERATING & ACCEPTANCE OF THE SYSTEMS BY THE OWNER.
- 16. NO FLAMMABLE MATERIAL SHALL BE ALLOWED ABOVE ANY CEILINGS OR RETURN AIR PLENUMS.
- 17. THE DIV. 15M MECHANICAL CONTRACTOR SHALL BE THE CONTROL CONTRACTOR & SHALL COORDINATE WITH THE ELECTRICAL CONTRACTOR FOR THAT WIRING HE PROVIDE & HE MAY PROVIDE SOME LIMITED MEDIUM & ALL LOW CONTROL VOLTAGE WIRING (LIMITED 110-120V, AND ALL 24V) FOR ALL HVAC CONTROLS OF UNITS EQUIPMENT & CONTROLS WIRING SUCH AS TERMINAL DEVICE BOXES AND CONTROLS & MOTORIZED DAMPERS, EQUIP. CONTROL PANELS, ETC. THE SOURCE OF ALL MAIN ELECTRICAL SUPPLY POWER VOLTAGES (NOT FOR NEW THERMOSTATS) & MAJOR HVAC PANELS & REQUIRED JUNCTION BOX(S) SHALL BE PROVIDED BY & UNDER THE ELECTRICAL CONTRACTOR. ALL CONTROL PWR. TRANSFORMERS SHALL BE SHALL BE FURNISHED & INSTALLED BY THE BY DIV.16 ELECTRICAL CONTRACTOR
- 18. THE DIV. 15M MECHANICAL CONTRACTOR SHALL PROVIDE ALL HVAC TESTING & BALANCING (T&B) TO BALANCE THE NEW HVAC UPGRADE SYSTEMS AND ALL NEW DUCTED AND TERMINAL VRV EQUIPMENT AIR SYSTEMS (AS APPLICABLE TO THE WORK), FOR ALL AIR FLOWS OF THE NEW SYSTEMS. DIV. 15M MECH. CONTRACTOR SHALL PROVIDE AN SIGNED AFFIDAVIT THAT THE NEW HVAC AIR SYSTEMS HAVE BEEN ADJUSTED AS INDICATED ON THESE DWGS. (SUBMIT COPIES TO OWNER & ENGINEER).
- 19. IF ANY DUCTWORK IS INSULATED OR TO BE INSULATED, ALL INSULATION SHALL HAVE MASTIC OVER ALL JOINTS OF THE DUCTWORK & INSULATION; DUCT TAPE IS NOT

20. ALL NEW MECHANICAL EQUIPMENT SHALL BE IN COMPLIANCE TO ASHRAE 90.1

**GENERAL OUTDOOR DESIGN TEMPERATURES:** = 10 DEG F DB = 92 DEG F DB / 74 DEG F WB (NOTE: NOT ALL SPACES LISTED MAY BE APPLICABLE TO THIS PROJECT) INDOOR DESIGN CONDITIONS: (AS APPLICABLE) SUMMER LOBBY AREAS 75-78 DEG F DB/ 50% RH \*68-72 DEG F DB 75-78 DEG F DB/ 50% RH \*68-72 DEG F DB LABS OR RESEARCH ROOM AREAS

OFFICES & ADMIN SPACES 75-78 DEG F DB/ 50% RH \*68-72 DEG F DB ETS & COMPUTER ROOM SPACES 70-74 DEG F DB/ 40-50% RH \*68-72 DEG F DB SPECIALTY SPACES (SECURITY, ETC) 74-78 DEG F DB/ 50% RH \*68-72 DEG F DB 75-78 DEG F DB/ 50% RH \*68-72 DEG F DB GENERAL SPACES MOVING TRANSIENT SPACES

75-78 DEG F DB/ 50% RH \*68-72 DEG F DB 85 DEG F DB/ 60% RH \* 65 DEG F DB ELECTRICAL/TELECOM 90 DEG F DB/ 50% RH \* 60 DEG F DB MECHANICAL ROOMS SPECIALTY SPACES (ENVIRONMENTAL) (AS MAY BE NOTED FOR DB & % R.H.) ETS & COMPUTER ROOM SPACES 70-74 DEG F DB/ 40-50% RH \*68-72 DEG F DB \* 50% RH IS A TARGET DESIGN POINT, (+/-15%), UNLESS NOTED OTHERWISE.

NOTE: SYSTEMS ARE NOT DESIGNED FOR CONTROLLED DEHUMIDIFICATION OR

SETPOINTS, UNLESS SPECICALLY NOTED OTHERWISE ON THE DOCUMENTS.

HUMIDIFICATION TO PROVIDE AND MAINTAIN ANY CONTROLLED RELATIVE HUMIDITY

SOME MECHANICAL SYMBOLS AND ABBREVIATIONS SHOWN ON THIS DRAWING MAY NOT BE APPLICABLE TO THIS PROJECT.

OUTDOOR UNIT

"MS-1": MATCHING MINI-SPLIT OUTDOOR EXTERIOR MTD. AIR-COOLED CONDENSING UNIT (MTD. ON CONCRETE SUPPORT PAD) w/ALL REFRIG. LINES & CONTROL WIRING & CONDENSATE DRAIN

REVISIONS DATE **DESCRIPTION** BY IFOB DEC. 16. 2019 ISSUED FOR OWNER BIDDING. JJC



S.BRAUNBECK & J.CAPITAN CAPITAN

DEI JOB NO. 19005

FLOOR

DESIGN & ENGINEERING **ENERGY SYSTEMS** INFRASTRUCTURE UTILITIES DECEMBER-16-2019 | SYSTEMS ANALYSIS COMMISSIONING REVIEW

PHSE

PRESS

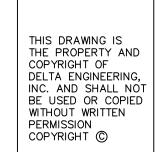
PENTHOUSE

PRESSURE



YR

YEAR



MECHANICAL LEGENDS, ABBREVIATIONS, & GENERAL NOTES FOR FLAT ROCK & RUGBY MIDDLE SCHOOLS

2019 - 2020 HVAC UPGRADES TO FLAT ROCK & RUGBY MIDDLE SCHOOLS

DRAWING

HENDERSON COUNTY PUBLIC SCHOOLS 414 - 4TH STREET, HENDERSONVILLE, HENDERSON COUNTY, NORTH CAROLINA 29621